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— Harvard's two hundred and fiftieth anniversary and Columbia's one hundredth seem insignificant when we read that the University of Bologna will next spring celebrate the eight hundredth anniversary of its supposed foundation, the exact date of which is not known.

— M. Bernard Perey, whose books on infant and child psychology have been so successful, is at work on another of the same character, entitled 'La petite fille.'

— The University of Utrecht has now 37 professors, — theology, 4; law, 7; medicine, 9; science, 10; letters, 7, — 7 lecturers, and 5 priv-docents. 541 students are attending the university.

— After a heavy shower in Washington last week, the gutters and low places were covered with a deposit of fine yellow powder. Professor Ward pronounced it vegetable pollen, which came from the pine-trees of the district. It was very light, and was carried into the upper regions and washed out by rain. Professor Ward said, "It is the male element of the pine-trees, which usually shed their pollen at this season. It consists of minute grains, like little spores, and to the naked eye looks like yellow dust, but, subjected to the microscope, the grains have different shapes, which differ with the varieties of pine. It is common wherever pine-trees exist."

— The U. S. geological survey will collect all attainable information regarding the recent earthquakes in Arizona. Circular letters of inquiry will be sent to residents on the area affected, as usual. The disturbed area seems to be a circle of some four hundred miles radius, fully one-quarter as large as the Charleston earthquake, and nearly one-third of the area of the Riviera earthquake of last February.

— Dr. Sternberg left, May 3, for Rio de Janeiro, to investigate yellow-fever. He expects to return in September.

— Houghton, Mifflin & Co. have just published, in the 'American commonwealths' series, Prof. Alexander Johnston's history of Connecticut. Lee & Shepard have in preparation new editions of 'Milch cows and dairy farming' and 'Grasses and forage-plants,' by C. L. Flint of the Massachusetts state board of agriculture. Both are being carefully revised, and brought down to date.

— Sir Austen Henry Layard is now preparing for the press his early adventures in Persia, Susiana, and Babylonia, which will include an account of his residence among the Bakhtiyari and other wild tribes before the discovery of Nineveh. It will be published by Mr. John Murray.

## LETTERS TO THE EDITOR.

\*.\*The attention of scientific men is called to the advantages of the correspondence columns of SCIENCE for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

### Osteological notes.

IN *Science* for April 15, Mr. F. A. Lucas takes very courteous notice of my observations upon the rudimentary metacarpals of *Bison bonasus* (the auroch). As I remarked therein, the data were altogether too fragmentary upon which to draw conclusions. Still, it would seem, so far as my observations go, that the American bison exhibits only one rudimentary metacarpal, and that one invariably the fifth; while the European bison, according to Owen, develops both second and fifth. The skeleton in the Museum of comparative zoölogy presents only one, the second, without a trace of an articulating facet for the fifth.

I have again carefully examined the eight disarticulated and the two mounted skeletons of the *Bison americanus* in this museum, and in not one do I find a trace of an articulating facet for the second metacarpal. In *Bos taurus* the same is true, with the exception that occasionally, in place of the second metacarpal, there is present a very rudimentary styloid completely ankylosed to the cannon bone, and appearing as an exostosis. It could not be termed in any sense a rudimentary metacarpal.

Mr. Lucas says that an examination of four or five of the skeletons of *Bison americanus*, with which the U.S. national museum has lately provided itself, shows that in every case, rudiments of the second and fifth metacarpals are present, and that, as they are all *in situ*, there can be no mistake in the matter.

Possibly Mr. Lucas and myself differ as to what constitutes a rudimentary metacarpal; and I maintain that a distinct metacarpal, however rudimentary, requires the presence of an arthrodial facet upon the corresponding surface of the cannon bone. Nor do I believe, that, once such facet is developed, it ever disappears.

I can find no authority, except Owen on *Bison bonasus*, that speaks of the Bovinae as having more than one rudimentary metacarpal, and that the fifth.

If, as Mr. Lucas says, "there exists on the mounted skeleton of *Bison americanus* in the U.S. national museum a well-defined *articular facet* for the second right metacarpal," I yield.

At present my personal observation allows me to make the following deductions: —

1. That *Bison americanus* exhibits only a single rudimentary metacarpal, and that invariably the fifth.

2. That *Bison bonasus* may exhibit one or both rudimentary metacarpals; if only one, that this may be either the second or fifth.

D. D. SLADE.

Cambridge, April 19.

With Dr. Slade's permission, I will add a few lines to his polite rejoinder to my note of April 15, he having kindly permitted me to read it before publication.

I fear I must indeed differ with Dr. Slade as to what constitutes a rudimentary metacarpal, holding that a bone, be it never so small, if constantly found

occupying the position of a metacarpal, must be considered as its degenerate representative, even if not articulating with the carpus or metacarpus by means of an arthrodial facet. This assumption would seem to be borne out by such cases as those of the telemetacarpal deer, in which the distal portions alone of the second and fifth metacarpals are present, and there is no articulation whatever with the cannon bone.

Would it not also be equally correct to deny the right of the 'spurious hoofs' in bison to be called phalanges because they have no connection whatever with the metacarpals?

Now, in *Bison americanus* there is in every 'rough skeleton' examined a bone about ten millimetres in length, occupying the place of the second metacarpal. Although this bone very rarely exhibits the slightest trace of an arthrodial facet, it is nevertheless, from my stand-point, to be considered as a rudimentary metacarpal. If not a metacarpal, what is it? In two skeletons out of six, there is a small facet on one leg only, but the little bone above mentioned is the bony core of a symmetrically shaped

### The maxillo-palatines of *Tachycineta*.

The person who 'found fault' with Dr. Shufeldt's figure of *Tachycineta thalassina* (see *Science*, ix. No. 221) would like to say a few words by way of explanation. I regret that my remarks should have been construed as mere fault-finding. Nothing was further from my intentions, and I should be extremely sorry to have requited the many courtesies received at the hands of Dr. Shufeldt in any such manner. The shape of the maxillo-palatines of *Tachycineta* constituted one of the links in the chain of Dr. Shufeldt's argument; and, as my own conclusions in the subject under discussion were quite different from his, it was needful for me to point out any flaws, either of text or figure, which had a bearing on the subject. While, at the time of writing the 'Affinities of *Chaetura*,' there was no specimen of *T. thalassina* at my disposal, I did have many specimens representing every other species of North American swallow. All of these agreed with one another in the shape of the maxillo-palatines, and

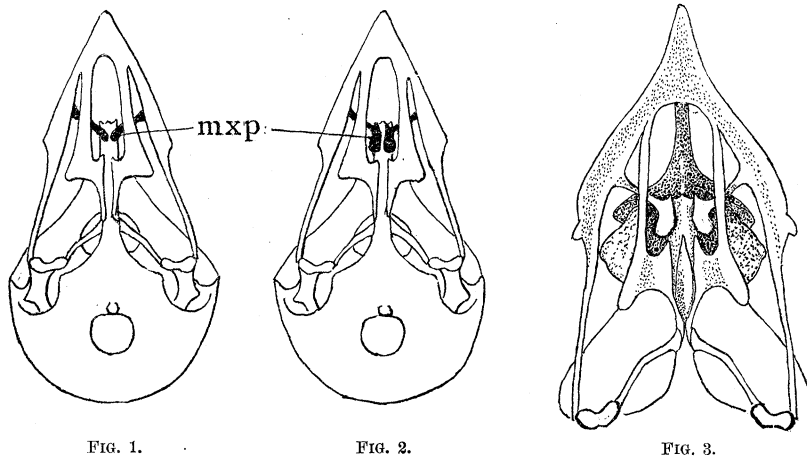


FIG. 1.

FIG. 2.

FIG. 3.

cartilaginous mass very like the better-developed fifth metacarpal.

Examination of the skeleton of aurochs in the U.S. national museum shows that the facets for the articulation of the fifth metacarpal are much larger and more sharply defined than are those for the articulation of the second.

Owen notes that the genus *Bison* has two small metacarpals, and it would seem safe to assume that this is the normal number, the Cambridge skeleton being in this respect abnormal.

The deductions that I would make are these:—

1. *Bison bonasus* possesses two rudimentary metacarpals, both of which articulate with the cannon bone by arthrodial facets.

2. *Bison americanus* possesses two rudimentary metacarpals, but the outer one alone regularly articulates with the cannon bone.

To Dr. Slade, however, belongs the credit of pointing out that in this respect the American and European bison are different, and that the American is just a shade more modified.

FREDERIC A. LUCAS.

Washington, D.C., April 29.

differed *in toto* with those of the skull figured by Dr. Shufeldt. On the strength of these facts, I ventured to state that the figure was imperfect in this particular; and a skull of *T. thalassina* since procured has the maxillo-palatines like those of its relatives. Of the accompanying figures, fig. 1 is a tracing of Dr. Shufeldt's figure in the Proceedings of the zoological society, fig. 2 is the same figure with the maxillo-palatines drawn from a specimen in the national museum, while fig. 3 represents the palate of the purple martin (*Progne subis*), which shows the characteristic form of the Maxillo-palatines in the swallows. Fig. 2 is not quite so good as I would like, but there is no time to make a better figure. In the examination of scores of crania, representing many species of birds, I have never met with a single case of individual variation of the maxillo-palatine process, to say nothing of so great a departure from the specific type as that indicated in Dr. Shufeldt's figure. In fact, the shape of this process has been found very constant in closely allied species, all the thrushes examined having one pattern, the wrens another, and so on. This being the case, it would